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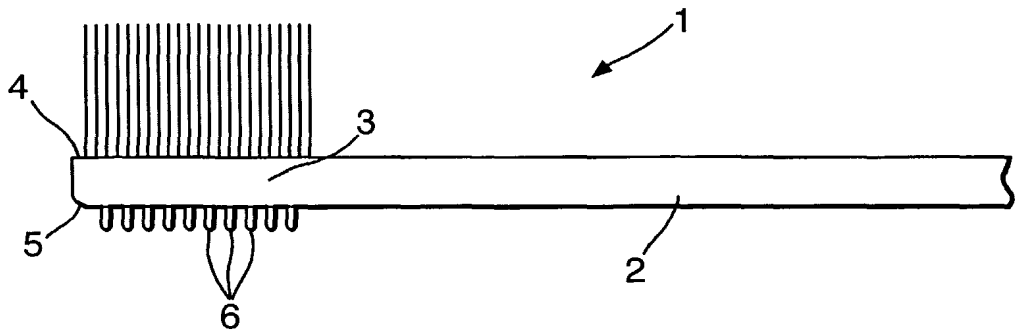
(54) Title: TOOTHBRUSH



(57) Abstract: Toothbrush comprising a handle and a bristle-bearing head attached thereto, said head comprising a bristle-bearing face and an opposite face, said opposite face comprising an array of resilient wall-like massaging flaps.

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TOOTHBRUSH

The present invention relates to a toothbrush comprising resilient wall-like flaps.

WO 98/18364 (P&G) describes a toothbrush with combination of bristles, soft cleansing pad and/or polishing fingers. The polishing fingers are preferably made of a thermoplastic elastomer and the soft polishing pad is an absorbent pad capable of providing an improved cleaning benefit.

GB-A-2 040 161 (Vowles) describes an improved toothbrush comprising, in addition to conventional bristles tufts, a gum massaging member located outermost on opposite sides of the brushing surface.

WO 98/22000 (Asher) discloses a toothbrush comprising a plaque removing member being formed from a mixture of relatively soft elastomeric material and particles of an abrasive material.

Despite the presence in the prior art of brushes with lamellae on the bristle bearing surface there has been no attempt to use lamellae on the back face of the toothbrush head.

We have surprisingly found that providing a brush head with resilient wall-like flaps on the back face of the brush head provides a multitude of sensorial, cosmetic and physiological benefits to the user.

Accordingly, the present invention provides a toothbrush comprising a handle and a bristle-bearing head attached thereto, said head comprising a bristle-bearing face and an opposite face, said opposite face comprising an array of resilient wall-like massaging flaps.

The flaps on the reverse face of the head provide their benefit either while the brush is being used conventionally, i.e. during regular toothbrushing, or even as a specific act upon the oral care surfaces, e.g. as a polishing element on the tooth or a scraping effect on the tongue.

Preferably the flaps comprise a resilient material such as rubber, plastic or an elastomer, more preferably a thermoplastic elastomer such as those well known in the art.

Rubbery flaps effect a gentler action on the oral care surfaces with massaging the buccal surfaces during regular toothbrushing or even massagin the gums as a separate action.

The head of the toothbrush will typically comprise a substantially hard material in which are embedded the bristles. Typical materials for the brush head include polyolefin such as polypropylene or acrylonitrile and nylon.

The massaging flaps of the invention may thus be materially part of the brush head or independent therefrom. Where they do comprise different materials they may be bonded to each other to secure the flaps to the brush head. Bonding may be mechanical, chemical or otherwise. Mechanical bonding may be

by way of an independent adhesive or by apertures in the brush head through which protrude the flaps. Chemical bonding may be by way of including similar elements in each of the materials. For example, thermoplastic elastomers comprise some degree of polyolefin. When melted the polyolefine element of the thermoplastic elastomer will bond chemically with a polyolefin component of the head. Further bonding methods include welding and sonication.

The flaps may be linked to one another or be separate from one another. It is preferred that they linked to one another to facilitate manufacture: they can thus be moulded in one step. Where they are linked to one another it is preferred that they are attached to a common base plate which itself is attached to the head. The base plate may cover from 25 to 100% of the opposite face of the brush head, preferably from 25 to 95% or whatever area is required to be covered.

A separate base plate allows separate manufacture of the brush head and flaps. This allows for changes in the design of either to be made quickly and efficiently. Further, it allows for the same base plate to be adapted to any new design of toothbrush. Where the base plate is detachable from the toothbrush head it also allows several base plates to be available to the consumer such that different plates can be used for different circumstances. For example, one can be used for massaging the gums while another is used for polishing the teeth or scraping the tongue after toothbrushing.

Where a base plate is employed it is preferred that the base plate comprises a bulge in the centre to extend the flaps further in the centre without impacting their structural integrity and efficacy, i.e. the flaps physical dimension are the same but they are allowed to extend further in the centre because of the bulged base plate.

In an alternative embodiment a bulge can be provided by contouring the opposite face of the brush head.

The flaps will extend from the brush head by a maximum distance *d*. This maximum distance *d* is the average of the maximum distances by which each of the flaps extend from the brush head. The value of *d* typically ranges from 0.1 to 2 mm.

Where there is a bulge it is preferred that the bulge has a depth from the brush head of from 0.1 to 3*d*. This is to ensure that the correct dimensions are being maintained to provide the desired sensorial effect. Where *d* is large the brush's reverse face has a pronounced bulge and exhibits a focused effect on the oral cavity surfaces, e.g. it allows for a more targeted effect whether polishing, massaging or scraping, etc.

The brush may also comprise the same resilient material in the handle or the head. In the head the resilient material may be used to provide flexibility to the head and in the handle to provide an improved grip. The resilient material may thus be linked to common areas such that the material is provides to the brush in one injection mould step. The link

between the sections may be hidden from view by way of channels through the material making the rest of the brush or by visibly present channels on the brush surface.

Where the flaps comprise a thermoplastic elastomer (TPE) the Shore A hardness of the TPE is preferably from 15 to 65, more preferably from 25 to 55.

Preferably the flaps are separated from one another by a distance equal to from 0.5*d* to 2*d*, preferably from 0.75*d* to 1.75*d*. This specific distancing with respect to height provides the flaps with a superior sensorial effect on the buccal lining during use. If the flaps are too far apart they will be sensed individually and if they are too close to one another their special sensorial effect will not be perceived at all.

While the flaps may extend along the brush head in any direction it is preferred that the wall-like flaps extend along the brush head in a direction the main component of which is substantially transverse to the general longitudinal axis of the brush head. This enables the flaps to exert their sensorial effect on the buccal lining when the brush is being moved along the teeth from one tooth to an adjacent tooth.

The flaps may also extend in a curved line along the brush head. This enables the sensorial effect to be provided should the user brush with a circular motion. Such a curved line is preferably arcuate and more preferably generally sinusoidal.

Where the flaps extend along the brush head in more than one direction it is preferred that at least 50%, more preferably 75% of the flaps extend n a similar fashion along the brush head. Should too many directions be used it may become difficult for the user to distinguish the individual directions used and this means that the massaging effect becomes lessened.

The flaps of the toothbrush will also have a width which may vary along the flap and may be different if measured at the base or tip, for example, the flap may be tapered away from the base.

In a preferred embodiment the average width *a* of the flaps measured at a mid point along each flap's length is from 0.1 to 0.7*d*, preferably from 0.15 to 0.5*d*. This enables the width of the flap to be detected during use in the mouth and against the buccal lining which is not so sensitive as other parts of the oral cavity. If the flap is too thick it will be perceived badly during use and if it is too thin it will deform too easily and will not be sensed at all.

In a further preferred embodiment the maximum width of any flap along its entire length is from 0.1 to 1.5*a*, preferably from 0.4 to 1.2*a*. This provides for an optimum effect during use and also makes the product easier to manufacture.

In a further preferred embodiment at least one flap extends for a distance equal to 1 to 20*d*, preferably from 5 to 18*d*. The ratio between the distance run along the brush head and

the distance extended from the head can be important in establishing the optimum technical characteristics of the flap. Should the flap not run for a reasonable length along the brush head there is a danger that it will deform too easily when brushed at an acute angle along the buccal lining. A flap of considerable length compared with its distance from the next flap provides a much improved effect.

In a further preferred embodiment at least one flap slopes towards the brush head at its edges. This reduces any harsh sensorial effect in having sharp edges rubbing against the oral cavity surfaces.

In a further preferred embodiment the flaps of the present invention may comprise an abrasive incorporated therein. Suitable abrasives include perlite, silica, chalk, calcined alumina and mixtures thereof. Such abrasives will be incorporated at from 0.1 to 3% by weight.

In yet a further preferred embodiment the flaps of the present invention may comprise an oral care benefit agent incorporated therein for delayed release during use. Such oral care benefit agents include anti-caries agents, anti-tartar agents, flavours, anti-malodour agents etc.

In yet a further embodiment at least one flap comprises a rounded tip portion for reducing any sharp sensorial effect during use. Conversely, should a sharp sensorial effect be required a sharpened edge can be provided for those consumers who prefer a harsh sensorial experience. These

sharpened tips may be directioned, e.g. towards or away from the tip of the brush head.

Certain embodiments of the present invention will now be discussed with respect to the following non-limiting drawings in which

figure 1 is a side elevation of a toothbrush according to the invention;

figures 2 to 7 are end-on views of a brush according to the invention;

figures 8 and 9 are side elevations of a toothbrush according to the invention;

figure 10 is a side elevation of a flexible headed toothbrush according to the invention;

figures 11 to 15 are plan views of the resilient flaps on toothbrushes according to the invention;

figure 16 is a side elevation of a brush according to the invention; and

figure 17 is a plan view of a head according to the invention.

In detail, figure 1 shoes a toothbrush (1) comprising a handle (2) and a bristle-bearing head (3) attached thereto, said head (3) comprising a bristle-bearing face (4) and an

opposite face (5), said opposite face (5) comprising an array of resilient wall-like massaging flaps (6).

Figures 2 to 7 disclose a similar brush head comprising an array of flaps, only the end-on flap (6) being viewable. In figure 2 the flap is symmetrical, extends a distance *d* from the brush head, and extends just short of the entire width of the brush head. In figure 3 the flap slopes at its edges. In figure 4 there are three flaps in a line making up almost the entire width of the head. In figure 5 the flap is short in the middle than at the edges. In figure 6 the tip edge of the flap is asymmetrical. In figure 7 the flap extends only for about half the width of the head.

Figure 8 discloses a brush head comprising an array of flaps. The array comprising flaps of a graduated nature extending further from the brush head at the centre of the array than at the edges.

Figure 9 discloses a brush head comprising an array of flaps. The array comprising flaps of a graduated nature extending further from the brush head at the tip of the head and extending progressively less from the head towards the handle.

Figure 10 discloses a flexible headed toothbrush comprising a pair of oppositely facing head sections (3a, 3b) linked by a flexible region (7). Each head section (3a, 3b) has on its opposite face an array of wall-like flaps (6a, 6b).

Figures 11 to 14 disclose various arrangement of flaps on the opposite face. In figure 11 the flaps are arcuate. In figure 12 the flaps are aranged transverse the general longitudinal axis of the toothbrush. In figure 13 the flaps are graduated being longer at the tip and getting progressively shorter towards the handle end of the brush head. In figure 14 the flaps are angled.

In figure 15 the brush head comprising a pair of oppositely facing sections each comprising an array of flaps (6a, 6b). The flaps on the tip section of the brush head have flaps arranged along the general longitudinal axis of the toothbrush while in the main section of the brush head the flaps (6b) are arranged transverse the same axis.

In figure 16, the flaps (6) are arranged on a support base (8) which bulges in the middle thus extending the distance from the brush head without weakening the integrity of the flaps in the centre.

Figure 17 shows a plan view of a brush head comprising a support base (8) upon which are located the flaps (6).

Figure 18 shows a flap (18a) with a wide base anchoring it to the brush head. Flap 18b is adhered straight to the base by an adhesive or otherwise, while flap (18c) is attached to a base plate which is itself adhered to the head.

In figure 19 there are three differently dimensioned flaps. Flap (19a) has a rounded end, flap (19b) has a sharpened tip

angled to one side and flap (19c) has a centrally sharpened tip.

CLAIMS

1. Toothbrush comprising a handle and a bristle-bearing head attached thereto, said head comprising a bristle-bearing face and an opposite face, said opposite face comprising an array of resilient wall-like massaging flaps.

2. Toothbrush according to claim 1, wherein the resilient wall-like flaps extend for a maximum distance *d* from the brush head and are spaced apart from one another by a distance equal to from 0.5*d* to 2*d*.

3. Toothbrush according to claim 1 or 2, wherein the resilient wall-like flap is made from a thermoplastic elastomer.

4. Toothbrush according to claim 2 or 3, wherein the elastomer has a Shore A hardness of from 15 to 45.

5. Toothbrush according to any preceding claim, wherein at least one of the wall-like flaps extends along the brush head in a direction substantially transverse a general longitudinal axis of the brush head.

6. Toothbrush according to any preceding claim, wherein at least one of the wall-like flaps extends in a curve along the brush head.

7. Toothbrush according to any preceding claim, wherein at least half of the wall-like flaps extend in

substantially the same direction along the brush head.

8. Toothbrush according to any of claims 2 to 7, wherein the average width *a* of the wall-like flaps as measured at a mid-point along any wall's length is from 0.1 to 0.7*d*.

9. Toothbrush according to claim 8, wherein the width of any one of the wall-like flaps along its entire length is from 0.1*a* to 1.5*a*.

10. Toothbrush according to any preceding claim, wherein at least one wall-like flap is tapered in cross section towards its tip.

11. Toothbrush according to any preceding claim, wherein at least one wall-like flap extends for an average distance of from 1 to 20*d*.

12. Toothbrush according to any preceding claim, wherein at least one wall-like flap slopes towards the brush head at its edges.

13. Toothbrush according to any preceding claim, wherein at least one wall-like flap comprises a flavour incorporated therein for delayed release during brushing.

14. Toothbrush according to any preceding claim, wherein at least one wall-like flap comprises an abrasive selected from the group consisting of perlite, silica, chalk,

calcined alumina and mixtures thereof.

Fig.1.

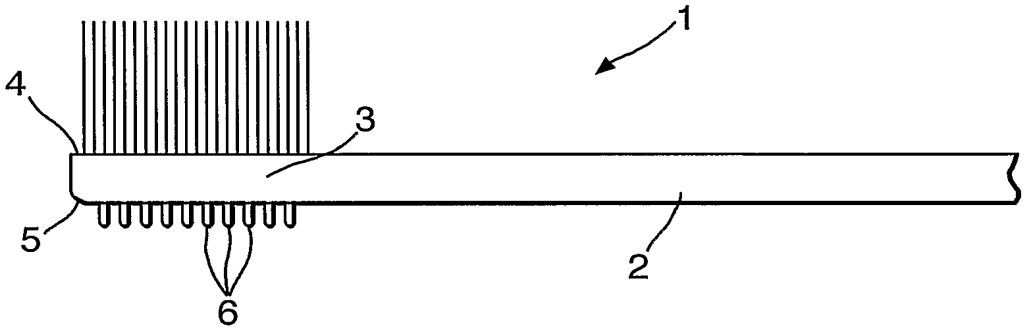


Fig.2.

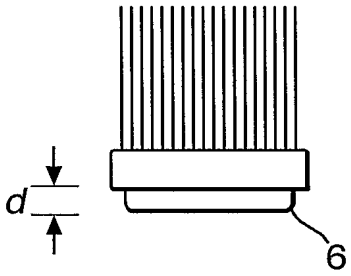


Fig.3.

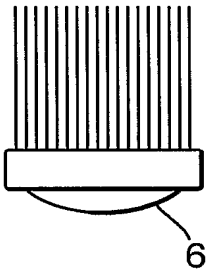


Fig.4.

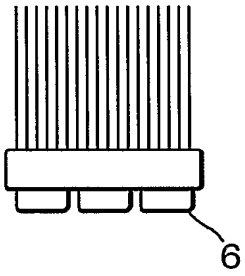


Fig.5.

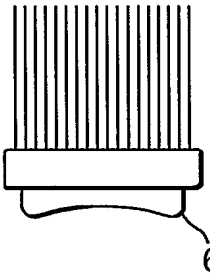


Fig.6.

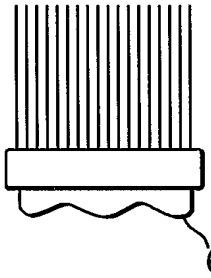


Fig.7.

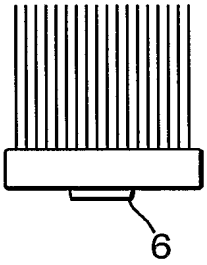


Fig.8.

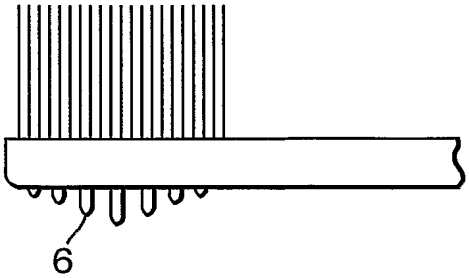


Fig.9.

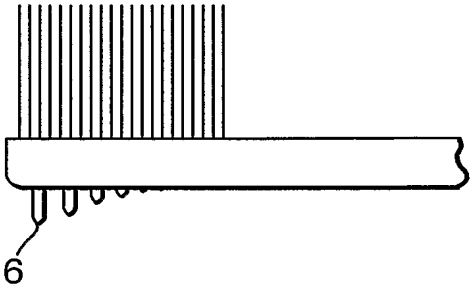


Fig.10.

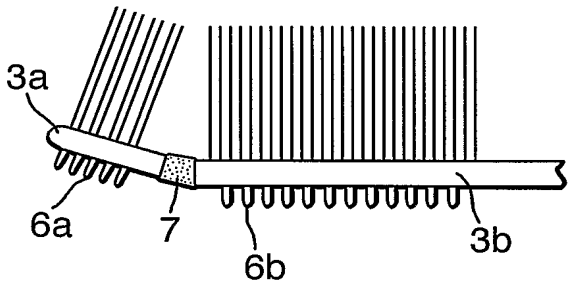
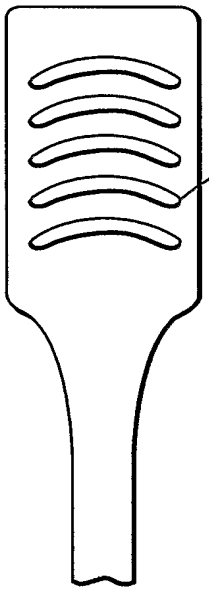


Fig.11.



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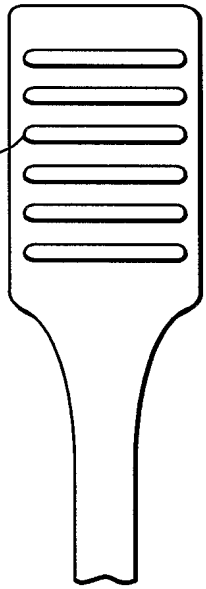


Fig.13.

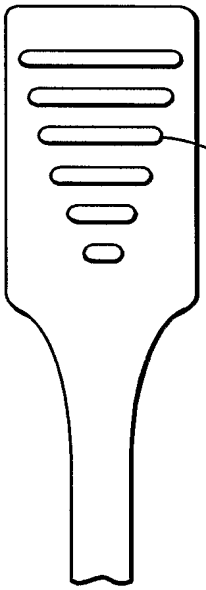


Fig.14.

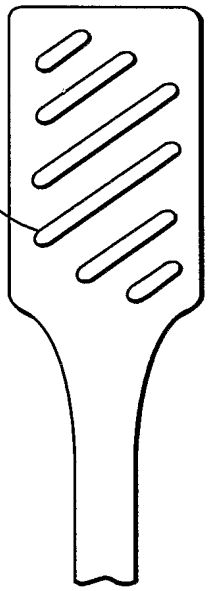


Fig.15.

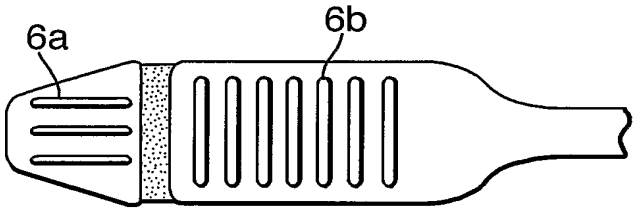


Fig.16.

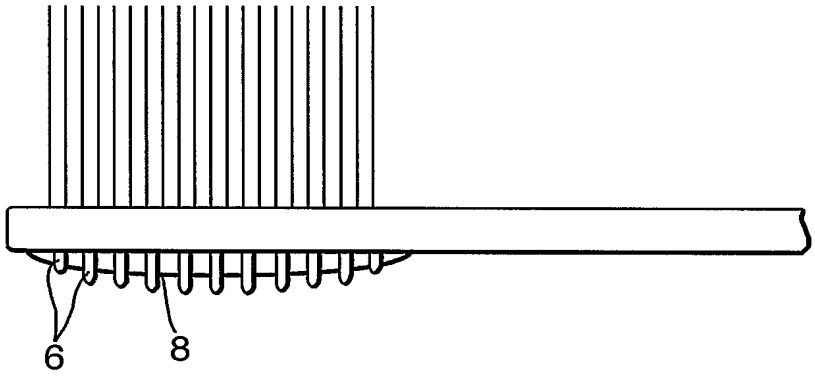


Fig.17.

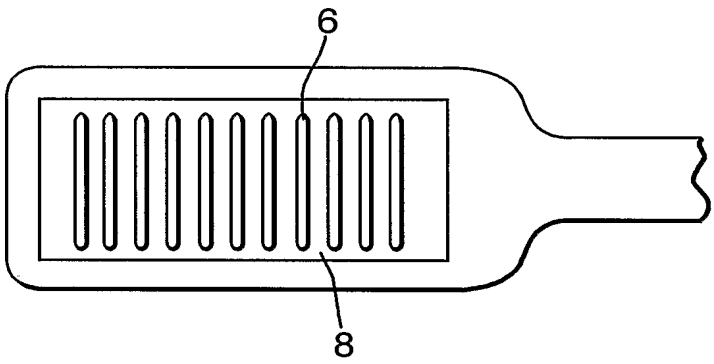


Fig.18.

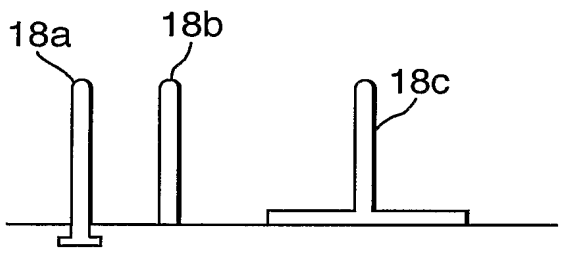
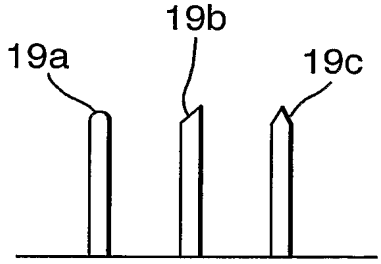


Fig.19.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/12065

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A46B15/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 119 296 A (NOE DENNIS ET AL) 19 September 2000 (2000-09-19) the whole document	1
A	WO 01 45573 A (BUCKLEY CHRISTOPHER DAVID ;FENG BORU (CN); WANG PING (CN); CHAN JO) 28 June 2001 (2001-06-28) the whole document	1
A	DE 857 128 C (OTTO AXTMANN BADEN BADEN DIPL) 27 November 1952 (1952-11-27) the whole document	1
A	WO 01 80686 A (LONG GEORGE ARTHUR HAMILTON) 1 November 2001 (2001-11-01) the whole document	1

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
19 February 2004	26/02/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Triantaphillou, P

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PCT/EP 03/12065

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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